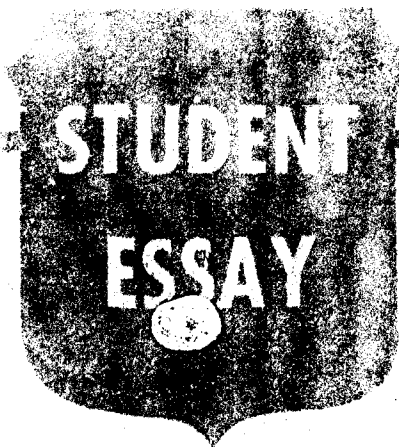


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WEATHER SUPPORT TO THE US ARMY: A CRITICAL REVIEW

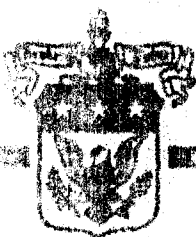
BY

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) LTC Milne has produced a fine detailed overview of the problems associated with weather support being provided by a different service. He strongly lists and explains the many difficulties of the AWS (USAF) working with and for the Army. His solutions at the end are general in nature and may never be fully adapted, but he has successfully given both the problems and some solutions. An excellent paper overall.		

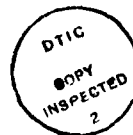
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WEATHER SUPPORT TO THE US ARMY: A CRITICAL REVIEW

BY

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Recognition of the importance of joint operations was a fundamental lesson learned by our military forces in World War II and in subsequent conflicts in Korea and Vietnam. Unfortunately, problems still arise between the Services because of conflicting doctrine, differing priorities, and lack of knowledge. Such problems exist between the U.S. Army and the U.S. Air Force's Air Weather Service. Both have a mission in defense of this nation. To succeed, each depends upon the other.

The Army is creating a ground force that is properly structured, manned, trained, and equipped. With respect to weather intelligence, it accepts gratefully whatever support the Air Force can (or is willing to) provide. On the other hand, the Air Force, through its Air Weather Service (AWS), tries hard to get its advice to the right people in a timely fashion. AWS has improved its planning and readiness for wartime support of the Army. Yet, the lack of progress in fulfilling their joint responsibilities demands attention.

My concern for the quality of weather support being given to the Army and the Army's capability to exploit the decision assistance offered by Air Weather Service prompted me to give some thought to these problems. As a result, in this article I will investigate the historical basis for Air Force weather support of the Army, address some of the major problems attendant to that support, and offer some solutions that may contribute to the synergistic relationship of the two organizations.

History is replete with examples citing the effects of meteorological conditions on warfare and the importance of weather service to military operations. From Hannibal's Carthaginian force's threat to Rome in 217 B.C. to the aborted U.S. hostage rescue attempt in Iran in 1980, weather has been a major factor in the outcome of military operations.

Certainly, one of the most famous weather forecasts ever issued was for Overlord, the Allied cross-channel invasion of France on June 6, 1944. Proper combinations of daylight, darkness, and weather parameters were critical to a successful operation. There could be no high winds that could produce heavy seas which could impede landing craft. Landings had to be made at low tide. Allied aircrews wanted clear skies while paratroopers wanted cloudy skies to protect them from German aircraft. The Allies needed at least three days of favorable weather to complete the buildup and establish critical over-the-shore supply lines. General Dwight D. Eisenhower, Supreme Allied Commander, tentatively chose June 5th as the invasion date but noted that "... the selection of the actual day would depend upon weather forecasts."¹

General Eisenhower's chief meteorologist, James M. Stagg, headed a team of U.S. and British weathermen charged with determining the expected weather conditions for the Normandy invasion. Stagg related that on 2 June "... I was expected to present General Eisenhower an 'agreed' forecast for the next five days which covered the time of launching of the greatest military operation ever mounted"² By early morning on the 4th, it was obvious that the weather would not be good enough, so Eisenhower postponed the invasion for one day. On the following day, Stagg forecast relatively good weather for the 6th. The signal was given to proceed. The D-Day invasion was on.

Commenting on the potential setback that poor weather conditions would have on the morale and effectiveness of the more than 2,000,000 men assembled for the Normandy invasion, General Eisenhower noted that,

Some soldier once said, 'The weather is always neutral.' Nothing could be more untrue. Bad weather is obviously the enemy of the side that seeks to launch projects requiring good weather, or of the side possessing great assets such as strong air forces,³ which depend upon good weather for effective operations.

Later in World War II, weather again affected Allied operations. Recalling the Battle of the Bulge, General Eisenhower stated, "As long as the weather kept our planes on the ground it would be an ally of the enemy worth many additional divisions."⁴

Weather also warranted close scrutiny by commanders during campaigns in Vietnam. General Creighton W. Abrams, Commander of U.S. forces in South Vietnam, wrote in late 1968,

Never in the history of warfare have weather decisions played such an important role in operational planning as they have here in Southeast Asia; Khe Sanh, the A Shau Valley, and Kham Duc are only a few of the many areas where weather has been a primary consideration in operational and intelligence planning.⁵

In the A Shau Valley operation the airmobile concept was tested under the worst possible weather conditions. Helicopter crews of the 1st Cavalry Division found they could operate in and around occasional heavy rain showers far better than they could in extremely low ceilings and fog. Although weather had been the key planning factor on the timing of this operation, the lesson learned was that one must be very careful to pick the proper weather indices in selecting an appropriate time for an airmobile operation.⁶

If a commander is to make well-reasoned decisions, it is imperative that he have timely and complete intelligence about the situation.

Weather intelligence is a part of combat intelligence. Weather effects on operations, as General Abrams pointed out, is a primary factor in planning. Weather, climate, and terrain are so interrelated that they must be considered together when planning air and ground operations. Weather elements are capable of drastically altering terrain features and trafficability. Conversely, terrain influences the local weather patterns. Close coordination between the staff intelligence officer, Staff Weather Officer (SWO), and staff engineer is a must to develop sound advice in the operational decision-making process.

The military organization responsible for advising Army commanders of current and forecast weather parameters is the U.S. Air Force's Air Weather Service. This shared capability results from agreements associated with the separation of the Air Force from the Army. Following enactment of the National Security Act of 1947, Generals Eisenhower and Spaatz directed their staffs to prepare jointly a series of agreements outlining the roles and missions of the Army and Air Force. One of the over 200 agreements reached made the Air Force responsible for the "provision of meteorological service to the Army, except Army meteorological ballistics data which will remain in the Army."⁷

Air Force Regulation 23-31 further spells out the AWS mission, telling AWS to provide or arrange for staff and operational weather service to Air Force and Army units as well as coordinate Air Force, Army, and unified or specified command operational environmental matters with other Government agencies.⁸

These weather services include:

Those scientific, technical, and advisory functions required to acquire, produce, and provide information on the past, present, and future state of the aerospace environment for use by military decision makers. These functions include weather observations, forecasts, space environment observations and

forecasts, climatological studies, weather modification, and weather reconnaissance.⁹

Weather support of this nature results from resources provided by the Army and Air Force. Both services have responsibilities in the mutually supportive effort to provide and exploit weather support. These responsibilities are outlined in a joint regulation, Army Regulation (AR) 115-10/Air Force Regulation (AFR) 105-3, Meteorological Support for the U.S. Army. Commonly referred to as "The Joint Reg" in AWS circles, AR 115-10/AFR 105-3 applies to active Army and Reserve Component users of weather support and Air Force units providing weather-related support to the Army.¹⁰ It specifies the policies, concepts, and methods used to satisfy Army weather support requirements and sets Army and Air Force responsibilities for communications and logistics necessary to conduct weather service operations.

The two Services have agreed that Major Army Commands (MACOMS), echelons above corps, and tactical units require weather support. A supporting Air Force weather unit will be assigned to all corps, divisions, and separate brigades, regiments, and groups when requested in peacetime or stated in operations plans in wartime.¹¹ The Air Force will determine the composition and size of the supporting weather unit based on the support needed. Further, the Army has agreed to reflect the associated tactical equipment and Common Table of Allowances (CTA) items furnished by the Army for use by the weather unit in the appropriate Tables of Organization and Equipment (TOE).

With all of the agreements and regulations defining the responsibilities of the Army and Air Force relative to weather support, one may wonder why I am still concerned about the quality and exploitation of weather services. I'm disappointed because neither party is

adequately fulfilling its obligations under the joint agreements and regulations. Neither party is sufficiently satisfied with the support of the other. Jointly they have not attained the cooperation necessary to develop the force multiplier potential of weather support to combat operations. Age-old Army problems of poor communications and inadequate equipment to support AWS are no closer to resolution today than they were 10, or even 20, years ago. AWS institutionally has not committed the resources, technology, or leadership to tailor weather support to the Army's needs; it hasn't been able to consistently articulate credible weather decision assistance to operational commanders, employing a wide range of weapon systems affected by weather.

AWS lacks an understanding and a depth of knowledge about Army operations. It has never fully learned how the Army thinks or does business. Historically, AWS has had difficulty defining what's important to Army operations. One weatherman, Colonel Keith R. Grimes, once summed it up, saying,

We have never welded our support to say, 'Okay, these are the things we can provide you. These are the ways your operations are impacted and these are the ways we can reduce the impacts.' You've got to really understand the role, say, of a mechanized infantry brigade and their combat tactics, before you can figure out what it is meteorologically that influences them one way or another, and how this can be reduced for them.¹²

The AWS people who served the Army in Vietnam were not, in most cases, trained or experienced in Army operations. Many who were assigned to Army support were unwilling to dedicate themselves totally to learning the ways of the Army. Facing only a one-year tour of duty, many "put in their time" until they could return home to the mainstream of Air Force life.

Little has changed today. Personnel assignment policies "protect" the weatherman from having two non-volunteer tours with the Army. Even

more frustrating to those who prefer and pursue Army support assignments is a perceived loss of promotion potential. A study of the validity of this perception is beyond the scope of this paper. However, several of those who have had a succession of Army support assignments have found it difficult to compete for top jobs in AWS. For example, few of the key officers in AWS today have experience in direct support to Army operations. Further, AWS commanders over the past 20 years have not served with Army tactical units.

Here lies another problem. The Air Force-oriented leadership of AWS has had difficulty allocating resources and technical capability to reduce the impact of weather on Army operations. Career progression and personal preference has often determined assignments rather than who has the experience and desire to provide optimum weather service.

Although AWS has provided the Army its fair share of support, using the latest scientific know-how as that applied to Air Force operations, the people in AWS who best understand the Army are not in the position to influence decisions or policy. Consequently, as former AWS Commander, Brigadier General Berry W. Rowe, once pointed out, "We probably have been a victim of Air Force solutions to Army problems."¹³

For example, in most cases new equipment is funded and developed to satisfy fixed-base airfield requirements of the Air Force. Even mobile weather radar or satellite tracking vans were designed to be transported to a theater of operations and operated in support of Air Force activities at fixed facilities. Although mobile, they certainly aren't tactical in the sense of being able to move rapidly over unimproved roads. They are not designed to "jump" with the Division Tactical Operations Center, and thus could never be employed in that role. Any

support the Army would get from such equipment is only as a spin-off (trickle down in today's vernacular) from its use by the Air Force in that theater.

Another example of Air Force solutions being adapted to Army problems is the development of AWS' Automated Weather Distribution System (AWDS). The long over-due program to modernize the Base Weather Station, AWDS is a system of micro-computers and digital display terminals eventually coupled with automatic weather element sensing devices to produce automated observations. Costing well over \$100 million, AWDS will be installed at about 150 Air Force and Army installations at CONUS and overseas locations. It will eliminate teletypes, speed the flow of weather data to operators, and give local forecasters a compute capability to exploit the latest mathematical and physical models of the atmosphere. Forecast reliability is expected to improve.

The Air Force is buying 20 of these systems for use in tactical operations. Eight are allocated for Army use at Corps level. They are expected to interface with the Army's All-Source (Intelligence) Analysis Center where the effects of weather will be married with other intelligence information to assist decision-makers.

Although costly, such a modernization has great potential. With respect to Army field operations, however, one flaw remains. The 20 tactical sets were added to the program at the insistence of the Air Staff. Air Weather Service arbitrarily selected eight for Army support without discussions with the Army about its future requirements. The tactical AWDS is designed as a van-enclosed, ruggedized version of the fixed equipment. The specifications were written and approved before a concept of operations was finalized and without regard for the weather requirements of the Army.

Concepts have not been developed on how critical weather data and forecasts will be made available to division commanders and below during the AWDS era. It appears that AWS is throwing money at some old problems but has neither the experience nor the leadership to effectively implement solutions that will improve support to one of its primary customers, the U.S. Army. Once again, what suits the needs of the Air Force is expected to suit the needs of the Army.

But, the Army isn't pure in this weather support dilemma either. It is equally inept at understanding how to best use weather service. It has not satisfactorily exploited AWS' capabilities.

Part of the problem results from indecision, and perhaps confusion, on the part of the leadership of the Army, regarding weather requirements in a combat environment. Some Army general officers have questioned the need for weather support to mechanized or armored divisions; others doubt the desirability of providing weather observing support down to maneuver brigade level. Yet, there are many who are forceful proponents of direct weather support at all levels and types of units. No clear-cut consensus has evolved.

Because of the known effects of weather on the operational success and safety of aircraft operations, the Army focused too much attention on the use of observations and forecasts at airfields. Unfortunately, some of the lessons learned in earlier wars have been forgotten or never fully appreciated.

Recently, however, more concern has been paid to the effects that weather plays on ground operations. Realizing that the enemy may outnumber him, the combat commander is now looking for any advantage he can find. If his 30 tanks will be opposed by 100, a force multiplier such as weather and its effect on terrain, trafficability, and logistics may

be used to turn the battle to his advantage. When faced with such circumstances, it becomes important for a commander to use every bit of information available to him to overcome the disadvantage of the numerical superiority of an opposing force.

The joint doctrinal guidance to assist commanders in understanding the AWS organization, its concept of weather support, and the effects of weather on his weapon systems and tactical decisions is badly outdated. Field Manual (FM) 31-3/AFM 105-4, Weather Support for Field Army Tactical Operations was written in 1969.¹⁴ None of the lessons learned from Vietnam are documented. Although the concepts have changed since the Vietnam War, no one can study them; there's no consistent, standardized basis for effective use of weather support. I doubt that the outdated manual reflects a lack of interest on the part of either the Army or Air Weather Service. It probably does represent the difficulty experienced by them in coordinating an agreed doctrine. It's a shame, however, that Army tactical unit commanders and their attached SWO's must rely on their inexperience and undocumented lessons of the past to use weather advice to best advantage.

The organization of the Army may, in part, contribute to its inability to use weather advice effectively. In the Army, weather information is treated as intelligence data. Thus, the Staff Weather Officer (SWO) and his team are attached to the Intelligence unit (G-2/S-2) of the organization. Most of the SWO's assistance on weather matters, to include advice on the potential use of weather support to enhance efficiency of combat operations, is filtered through the intelligence staff. Direct contact between the commander or his operations staff and the SWO is limited. Consequently, officers in the combat arms

often move into brigade or division command with little exposure to the value of weather support or appreciation for the reciprocal needs of the Air Force weather team.

To insure effective service, the Army must overcome its unwillingness to provide resources needed by the weatherman. Because the SWO is left with the responsibility to determine and advise the Air Force of the operational weather support needs of the supported command, the Army unit commander is often insensitive to the resource requirements of his weather team. This lack of support by the Army commander causes much of the frustration to AWS and its weathermen attached to the Army.

Two key issues center on communications circuitry and terminal equipment in tactical operations and logistics items, particularly vehicles. Before proceeding further, one must understand that proper communications is the lifeblood of a weather unit. Most weather information is perishable. Large quantities must be acquired, analyzed, and disseminated quickly. If those data cannot be made available in a timely fashion, the weatherman is virtually useless and may as well be left home.

Because AWS supports most joint headquarters and its Army and Air Force components, maximum compatibility of equipment used for passing weather information is inherent to an effective exchange of weather data between units. For example, teletype terminals at Army and Air Force components must presently receive data transmitted from a joint task force headquarters at 100 words per minute (wpm).

As noted earlier, AR 115-10/105-3 outlines the responsibilities of both Services with respect to both communications and logistics. Specifically, for tactical operations the Army will:

- 1) Fund for, provide, install, and maintain weather communications circuits from the DCS (Defense Communications System) interface point to tactical locations where direct weather service is required.
- 2) Fund for, provide, and install standard Army tactical teletype and facsimile equipment at tactical locations.
- 3) Operate and maintain radio-teletype, multichannel, and other communications equipment in support of USAF weather teams.
- 4) Maintain (except operator maintenance) all communications equipment used by or in support of USAF weather teams.¹⁵

Frankly, the Army has failed to meet its communications responsibilities for years. Most Army units have given their weather teams an FGC-25X teletype. It normally operates at 60 wpm and is incompatible with those used in support of joint and Air Force forces. By changing gears, the FGC-25X can be operated at 100 wpm at risk of flying apart. (It often does). The terminal equipment is not commonly used by other Army units, so finding maintenance people with experience or who have seen an FGC-25X is nearly impossible. In fairness though, the Army has promised to provide a 100 wpm unit, the UGC-74, to the weather teams. It is not yet fielded and has some deficiencies, but operates at speeds compatible with other Services.

Radio-teletype (RATT) is widely used in tactical operations by several units as well as the weather team. The G-2 normally has assigned one to the SWO, but having one under battlefield conditions is tenuous. The SWO's priority is normally so low that if a RATT is needed by the G-2 for some other purpose, the G-2 will simply take the SWO's. It's happened often in field exercises. It will surely happen in war unless the Army recognizes its commitment to and need for timely, credible weather service.

In addition to the teletype, a second piece of communications

equipment needed by the SWO is facsimile. Forecasts of environmental conditions over the battlefield are transmitted by centralized forecast agencies via facsimile to the joint commander and his components. These forecasts are tailored to the needs of the combat unit, giving the Army SWO more information in less time than he could generate independently. Using facsimile reduces the data load on teletype and prevents circuit saturation. It also simplifies briefing preparation.

Unfortunately, the Army has never recognized the requirement for facsimile equipment. So, AWS has had to circumvent the system by taking Air Force facsimiles into a totally Army communications environment and hanging them on Army circuits. "Blue suit" maintenance is, of course, unavailable, and communications effectiveness is limited.

Similar problems exist in logistics. The "Joint Reg" calls for the Army to provide logistical support comparable with that furnished to Army units of similar size or activity. To be provided on the same priority of the supported unit, such logistics includes transportation, vehicles, field and depot maintenance, fuel, work space, et al.¹⁶

Here again, the priority of weather is low. Vehicles are always subject to appropriation by other agencies. Loss of jeeps, trucks, and expandable vans are commonplace. If the weatherman is to be a part of the team and be confident of making a positive contribution to the mission accomplishment of the Army unit to which he is attached, he needs the assets necessary to do his job.

AWS must be careful not to force the Army into unnecessary expense, however. AWS has identified 31 Air National Guard Weather Flights as the primary supporting units for Army National Guard Separate Brigades. Of the 10 to 12 people assigned to these Flights, six forecasters and

observers are designated in operations plans to mobilize and deploy with their aligned brigades. The remainder are tasked to support Mobilization Stations. Because of the agreements reached with the Army and the National Guard Bureau, AWS expects the Army to give each Weather Flight the communications and logistics support needed to train and perform its wartime mission. That's a reasonable request but difficult to fulfill.

Equipping 31 Weather Flights with vehicles, personal equipment, and facilities will cost the Army an exorbitant amount of money. Naturally, there's been a great deal of Army foot-dragging. Most Weather Flights are ill-prepared to live and fight with the Army although their technical capabilities match or exceed those of their active duty counterpart.

In an effort to retain all of the Weather Flights, AWS seems reluctant to consider alternatives. Many of the Separate Brigades will not be tasked in war plans as independent, maneuver brigades. Certain pre-designated brigades will serve as "roundout" brigades to active Army divisions. That is, not all Separate Brigades will act separately. These roundout brigades will obtain their weather support through the Division weather teams as is currently the practice. Consequently, not all Separate Brigades require their own direct weather support and attached Weather Flight. Therefore, all 31 Weather Flights are not needed in wartime. Reducing the number of Flights would save the Army millions of dollars in logistics costs and save the Air Force manpower. Somehow the parties can't reach agreement on the requirements.

After this long litany of problems related to weather support to the Army, what of the future? Will AWS be able to support the Army in future wars? Even if the aforementioned problems are resolved, I'm concerned that effective weather service will still be limited.

The heart of my concern lies with evolving Army doctrine and the difficulty AWS will have supporting operations which follow it. The Army is placing increasing emphasis on maneuver on the battlefield. Its new FM 100-5 (draft), Operations, "emphasizes tactical flexibility, speed, mission orders, the initiative of subordinates, and the spirit of the offense."¹⁷ What the Army sees as the best way to defeat an enemy compounds the combat support problems of AWS. Can AWS support maneuver warfare?

As noted earlier, weather elements depend heavily on communications above and below their own echelon. Data depicting the weather parameters beyond his visual range is vital to the weatherman. Further, the SWO must be collocated with the Army commander to give effective advice. In a fluid, highly mobile battlefield, however, keeping communications lines open will be extremely difficult. Army doctrinal changes that encourage initiative by commanders at lower echelons will result in tactical decisions being made at those lower echelons. Undoubtedly, those commanders will need direct weather support, but no efforts are underway to ensure they get support. To the contrary, recent AWS concepts appear to be shifting support upward to the Corps level. The proposal to field AWDS at the Corps, as noted earlier, is but one indication of that intent.

One might infer that AWS and the Army are rushing headlong in opposite directions. We cannot deny that problems exist, but positive steps are being taken by both Services to make weather service responsive at the critical decision points of the Army. Air Weather Service has assigned liaison officers at Training and Doctrine Command (TRADOC) headquarters and each of its major schools to provide the dialogue necessary to stay abreast of changing doctrine and requirements. TRADOC

has reciprocated by assigning a liaison officer to Headquarters, Air Weather Service. AWS has made major improvements in its war planning by including weather teams in the supported commands' Time-Phased Force Deployment Lists. Support to CONUS mobilization stations, once ignored, is now properly planned. Further, weather teams are in the field on every Army exercise in CONUS, Korea, Europe, and Panama. They've provided weather advice to Army units in Readiness Command exercises and Rapid Deployment Joint Task Force deployments overseas.

At AWS request, the Army is addressing some of the communications problems. Dialogue between AWS and Army Communications Command began a year ago. Understanding the problem is the first hurdle. Some progress is being made. As one of the toughest problems, tactical communications warrants high level interest and support.

The communications channels are open between the Army and AWS, but both parties must actively seek to improve the service and its use. Although problems abound, they are not insurmountable. Their solutions reside with both the Army and AWS.

The Army's foremost decision with respect to weather service is to decide if the support is worth the cost. Generals Eisenhower and Abrams apparently thought so, but Army leadership today should analyze the weather sensitivities of its weapons systems and soldiers. If the Army study indicates that weather decision-assistance is worthwhile, then demand the expected service from the Air Force. Don't be satisfied with capabilities designed to support the Air Force, but expect the technical competence, scientific applications, and operational concepts that meet anticipated Army requirements in land combat.

With such valid demands goes responsibilities, however. The Army needs to make a conscious decision to support the attached AWS weather teams in training, communications, and logistics. It must modernize its communications and insure that the weather teams' circuits and terminal equipment are comparable to that of the host Army unit. Required vehicles identified in TOE's must be assigned to weather elements with sufficient priority to assure their availability in the conduct of a team's mission. It won't be cheap, but improved weather service will be available when the Army needs it.

Air Weather Service must respond with creative thinking. It must identify those people who know Army operations and manage those personnel resources wisely. AWS will have to establish career incentives for those people who have exhibited the potential to serve in key Army support positions. Assignments in Army support must become career enhancing rather than career limiting. To overcome this stigma, AWS leadership will have to reshape its attitudes. It must approach support to the Army on a co-equal basis to that of the Air Force.

Be careful of becoming over-sophisticated. Over-reliance on automation and complex mathematics to model the atmosphere could be dangerous when trying to support an Army engaged in highly maneuverable combat far forward of reliable, secure communications. Use that capability, when available, but train and exercise forecasters in the fundamentals of the meteorological science. Devote resources to insure they can "go-it-alone," if necessary.

Air Weather Service periodically suffers from poor credibility. Remember that the key to credibility is a correct observation or forecast. Being able to deploy quickly, live like the Army lives, and give articulate briefings all contribute to credibility. But, the Army

depends on an accurate product. That's where credibility is ultimately gained or lost.

Therefore, improve the technical quality of the observations and forecasts. Look at the parameters that are specifically vital to Army operations. For example, investigate techniques to improve forecasts of helicopter icing, low-level wind shear, effects on trafficability, and others. Perhaps they're beyond the state of the science or art, but don't quit trying. The requirement is there; it's AWS' job, so devote the energies and money required to solve the problems.

Educate the Army. Instill in its future commanders at all echelons the value of weather and the importance it plays in the conduct of combat operations. Tell them AWS' capabilities and limitations. Be honest; lives may be at stake. If you don't have the capability to satisfy an Army requirement, don't bluff. Since you're the best qualified to give weather advice, do your best -- professionally and technically.

Finally, a plea to both the Army and Air Weather Service. Quit parochialism! You must solve the weather support problems jointly. Get smart in each other's business. Understand the value of weather service and work together to make it profitable. It's a force-multiplier if applied properly. We can ill-afford not to exploit it.

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